



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Michigan Coastal Management Program Pathway to Resilience

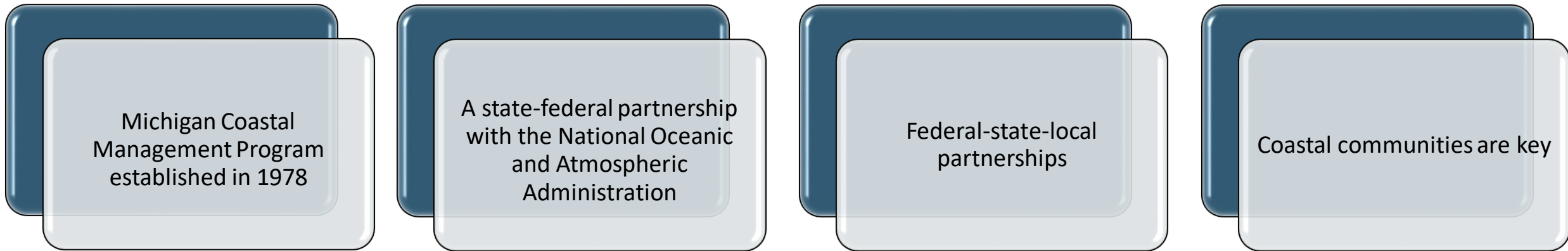
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Michigan Coastal Management Program



Michigan's Coastal Management Program (MCMP) is funded, in part, through the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, which supports a nationwide network of state-federal partnerships protecting America's fresh and saltwater coasts.



MCMP Mission

To protect, preserve, restore, enhance, and wisely develop the coastal natural resources and cultural heritage on the nation's longest freshwater coastline.

Strategic Goals



Plan for growth and change in coastal communities.

Adapt
Accommodate
Retreat



Protect, Preserve, Restore and Enhance coastal ecosystems.

Support use and enjoyment of current and future generations.



Build partnerships.

Strengthen and expand collective impact.

Provide Technical and Financial Assistance to Partners for Creative Coastal Projects

Public
Access

Community
Development

Coastal
Hazards

Coastal
Waters

Coastal
Habitat



Coastal Community Development Objective

The MCMP is committed to plan and manage future growth and development on lands adjacent to the coast, while protecting coastal natural resources, maritime heritage resources, water-dependent livelihoods and recreation, and other assets and activities that contribute to the community's sense of place.

SURVIVE AND THRIVE

Lessons from
Michigan Coastal Community
Planning for Resiliency

Examples of Work

Supporting community land use plans and zoning ordinances:

- ❖ Village of Sebewaing
- ❖ Harrison Charter Township
- ❖ Beaver Island – St. James and Peaine Townships

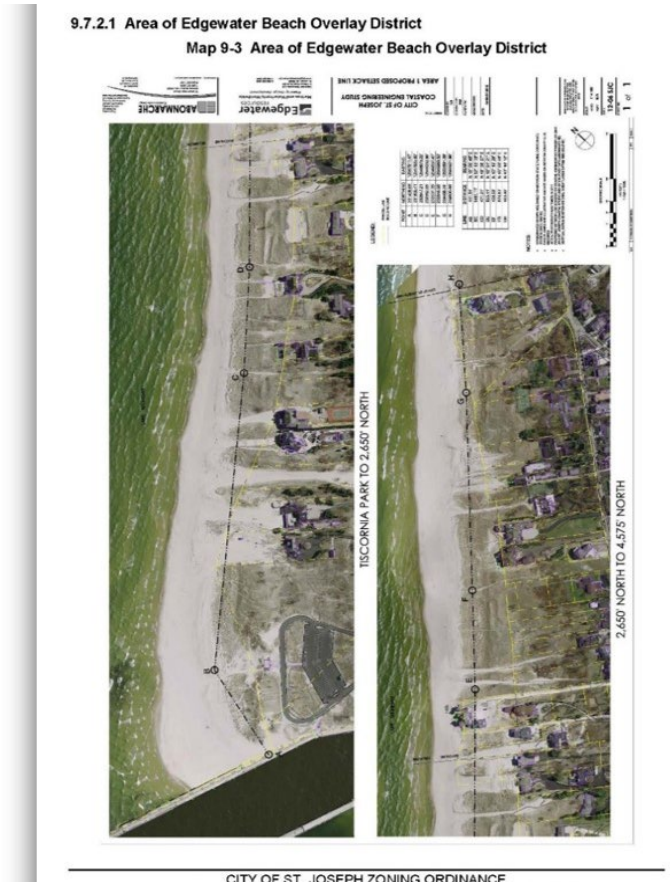


Coastal Hazards Objective

The MCMP is committed to increase coastal communities' understanding of the risks associated with living on the coast from coastal erosion, flooding, and dangerous currents to build the ability to absorb, respond, and adapt to impacts from coastal storms and Great Lakes water level variabilities.

Examples of Work – Coastal Hazards

St. Joseph Coastal Study



Grand Haven Setback Ordinance





Coastal Habitat Objective

The MCMP is committed to protecting, preserving, and restoring healthy coastal wetlands, beaches, and dunes. As the first defense against storm surge, natural infrastructure is critical for coastal communities' resilience, as well as maintaining beneficial ecological plans and animal communities.

Examples of Work – Coastal Habitat

Syndicate Park Dunes



Bringing the Latest Science to the Management of Michigan's Coastal Dunes

By

Alan F. Arbogast (Michigan State University)
Tanya Cahala (Great Lakes Consulting)
Charles F. Davis, III (Davis Associates Architects & Consultants, Inc.)
Suzanne DeVries-Zimmerman and Brian York (Hope College)
Brad Garmon (Michigan Environmental Council)
Deanna van Dijk and Jason VanHorn (Calvin College)



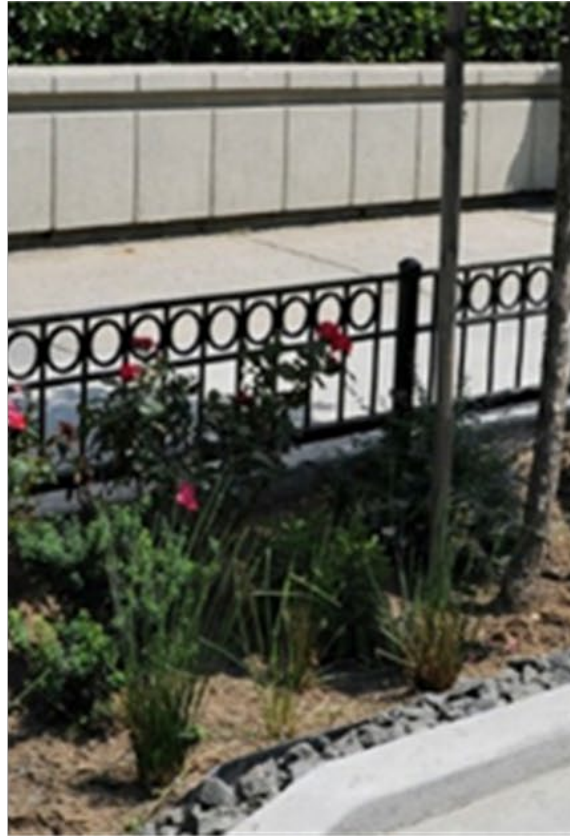
Michigan Environmental Council
May 2015



Coastal Waters Objectives

The MCMP is committed to the protection and management of coastal waters by working with partners for planning and installing nature-based solutions that benefit ecosystem services for managing storm water and flooding in coastal areas.

Examples of Work – Coastal Waters



Coastal Storms and Flooding Defenses
“Slow the Flow”



Enhancing Public Access Objectives

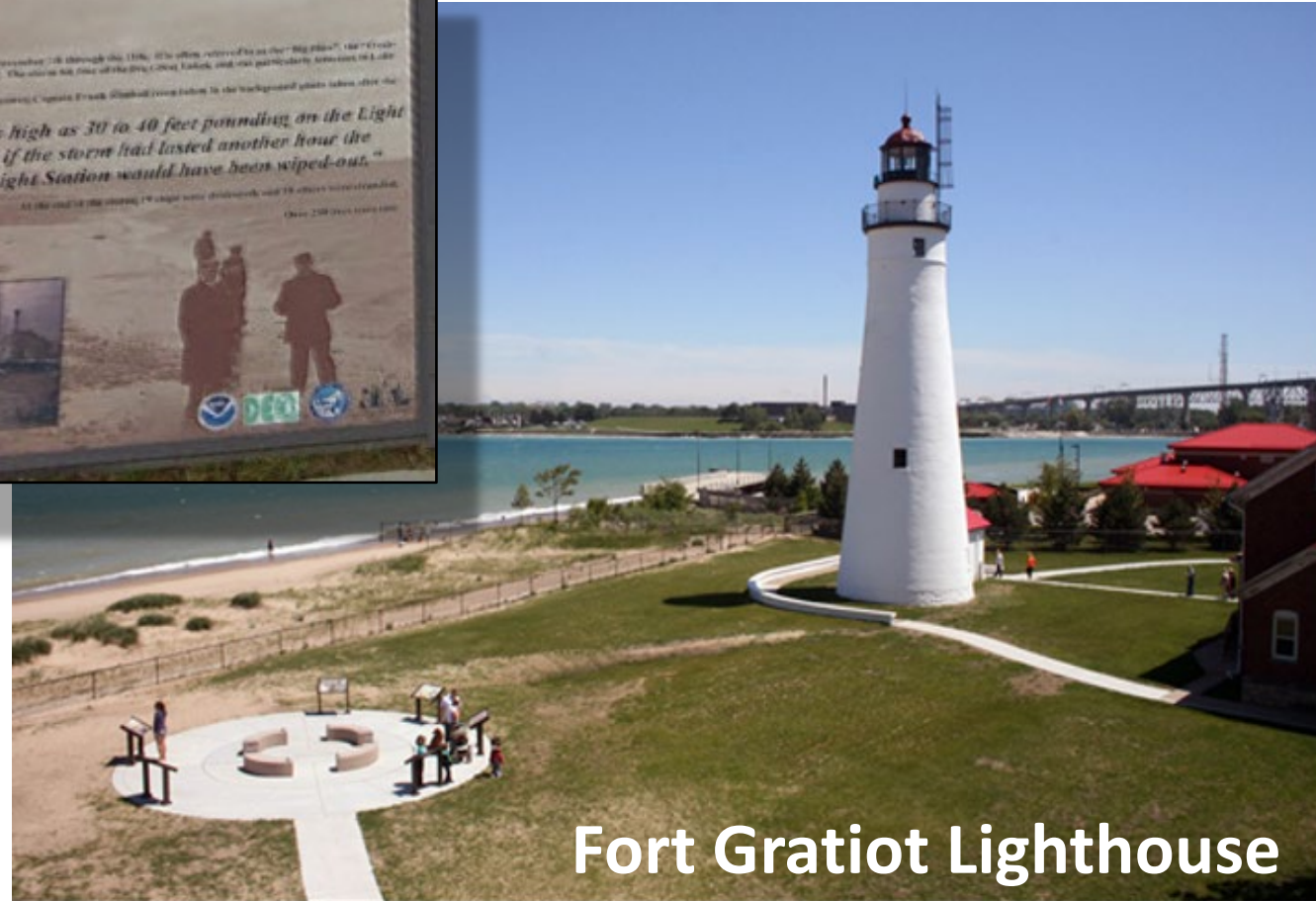
The MCMP is committed to enhancing public access to the Great Lakes using approaches that support coastal communities; foster appreciation of natural, cultural, and historic resources; and create tourism opportunities.

St. Clair Wetland Interpretive Boardwalk

- ❖ Leveraged previous GLRI habitat restoration with enhanced public access.
- ❖ Low-impact development (LID) techniques.
- ❖ Educational & interpretive signage.



Cultural and Maritime Heritage



Fort Gratiot Lighthouse

Building Coastal Community Resilience

Community resilience is defined as the sustained ability of a community to understand and use available resources to respond to, withstand, and recover from adverse situations.



Technical Assistance and Training

Technical Assistance

- Resilient Coast website
- Community Planning Guide
- Resilient Michigan Collaborative
- Resilient Communities Adaptation Strategies Toolkit (coming soon)

Coastal Leadership Academy Training

- Planning & Zoning Module
- Nature-based Solutions Module (coming soon)
- Adaptation Strategies Module (coming soon)

Healthy Habitat and Resilient Communities Initiative

- Nature-based solutions for habitat preservation/restoration and managing stormwater.
- Conceptual plans leading to implementation projects.



Innovative ideas for sustainable communities since 1993

Resilient Michigan Collaborative Vulnerability Risk Assessments

- ❖ Mini-grant program to assist coastal communities conduct a Vulnerability and Sustainability Assessment.
- ❖ Supports community planning efforts that lead to the adoption of resilient plans and policies that build resilience to economic, social, environmental, and coastal challenges.

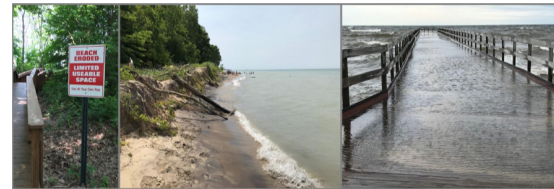
FRESH COAST BEST COAST

MICHIGAN COASTAL MANAGEMENT PROGRAM

Coastal Community Resiliency

Michigan's Dynamic Coast

The Great Lakes are experiencing all time high lake water levels. Great Lakes water levels rise and fall due to changes in precipitation, runoff, ice cover, and evaporation. Michigan's coastal communities are challenged by the unpredictability of these ever-changing lake levels and increasingly intense seasonal storms impacting the coast. Coastal Managers need to adapt within seasons for lake level changes measured in feet coupled with storms bringing higher waves and associated flooding and erosion impacts.



The Michigan Coastal Management Program (MCMP) is encouraging coastal communities to become a resilient community where the community can absorb and adapt to changes in the Great Lakes levels, coastal storms and floods; manage social and environmental changes; and build a better and more reliable local economy. Preserving natural systems can provide better protection than seawalls or revetments while providing additional recreational and economic benefits. Hazard-ready communities provide space for beach and dunes to migrate naturally, so they can continue to serve the community, which includes functioning to absorb erosion and flooding impacts.

What type of solutions are best for my community? Depending on your shoreline type and the wave energy level at the site, the type of protections needs to be customized to your community. Scenario-based planning can assist in devising the best options while maintaining community character.

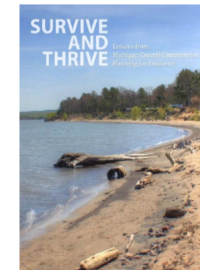
EGLE Environmental Assistance Center 800-662-9278 [Michigan.gov/EGLE](https://www.michigan.gov/egle)



Scenario based planning incorporates risk scenarios to help visualize what the "Expected – Lucky – Perfect Storm" may look like through a range of physical conditions. These scenarios, along with model plan and ordinance language are being developed to increase the knowledge for local decision-makers. A Resilient Master Plan better aligns with the community's vision for their coast and help institutionalize management measures to adapt, accommodate and 'step back' development from sensitive and dynamic coastal features.

Incorporating resilient principles into a master plan is a coastal community's first step to becoming resilient. Once these principles are in your master plan and priority areas are identified, communities can then use zoning ordinances to set standards such as set backs and building standards.

Learn more about coastal resilience planning concepts, including lessons-learned from early-adopting communities in Michigan Association of Planning's "Survive and Thrive: Lessons from Michigan Coastal Communities Planning for Resiliency" booklet. The booklet, available at <https://www.planningmi.org/community-resiliency>, was developed with MCMP support.



What can I do to get started? The MCMP provides annual funding opportunities where communities can seek grant funding for development of Resilient Master Plans and ordinances. For technical assistance and grant funding opportunities, visit us at www.michigan.gov/coastalmanagement

Additionally, the MCMP is partnering with LIAA in the Michigan Resilient Collaborative. To become a participating community, visit www.resilientmichigan.org for program information and grant funding opportunities

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Coastal Leadership Academy

- ❖ The CLA introduces participants to creative planning/zoning tools and adaptation strategies that can help address coastal challenges.
- ❖ Based on Building Coastal Resilience Video series.



American Planning Association
Michigan Chapter

FRESH COAST BEST COAST
MICHIGAN COASTAL MANAGEMENT PROGRAM

Coastal Leadership Academy

The Michigan Coastal Management Program (MCMP) and the Michigan Association of Planning (MAP) have teamed up to launch the Coastal Leadership Academy (CLA). The purpose of the CLA is to bring community leaders and planners together to share the coastal resilience challenges they are experiencing throughout their communities and learn strategies that can help address those challenges.

What is the CLA?
The CLA is a multi-session program that introduces participants to creative planning/zoning tools and adaptation strategies that can help address coastal challenges. The CLA uses a flipped classroom style where instructional learning is transferred from group to individual learning. During group sessions, coastal experts lead technical trainings demonstrating scientifically based tools and planning principles designed to inform complex decision-making and evaluate trade-offs involved in local coastal management.

What types of strategies are discussed in CLA?
The following Building Coastal Resilience Video Series provides the foundation for resiliency principles promoted throughout the CLA:

1. Overview of Michigan's Coastline - Take the first step to becoming resilient to these challenges and learn about the natural resources found on Michigan's coast.
2. Impacts of Water Levels and Weather - Take the next step to coastal resilience, and learn how the weather, climate, regional water budget, lake levels, and coastal processes influence our coastline.
3. Protecting the Coast for Everyone - Take the next step to coastal resilience and learn why the Public Trust Doctrine is vital for protecting the rights of coastal residents, communities, and visitors to access our coast.
4. Data and Tools for Making Informed Decisions - Take the next step to coastal resilience and learn about the data resources and tools available to coastal decision-makers to use to make informed decisions about managing their coastal resources.
5. Adaptation Strategies for Dynamic Coastlines - Take the next step to coastal resilience and learn how to promote wise development on the coast through adaption strategies that protect, accommodate, and sometimes retreat from the coastline.
6. Planning for a Resilient Future - Take the next step to coastal resilience and learn how to develop resilient master plans and policies that best fit your coastal community.

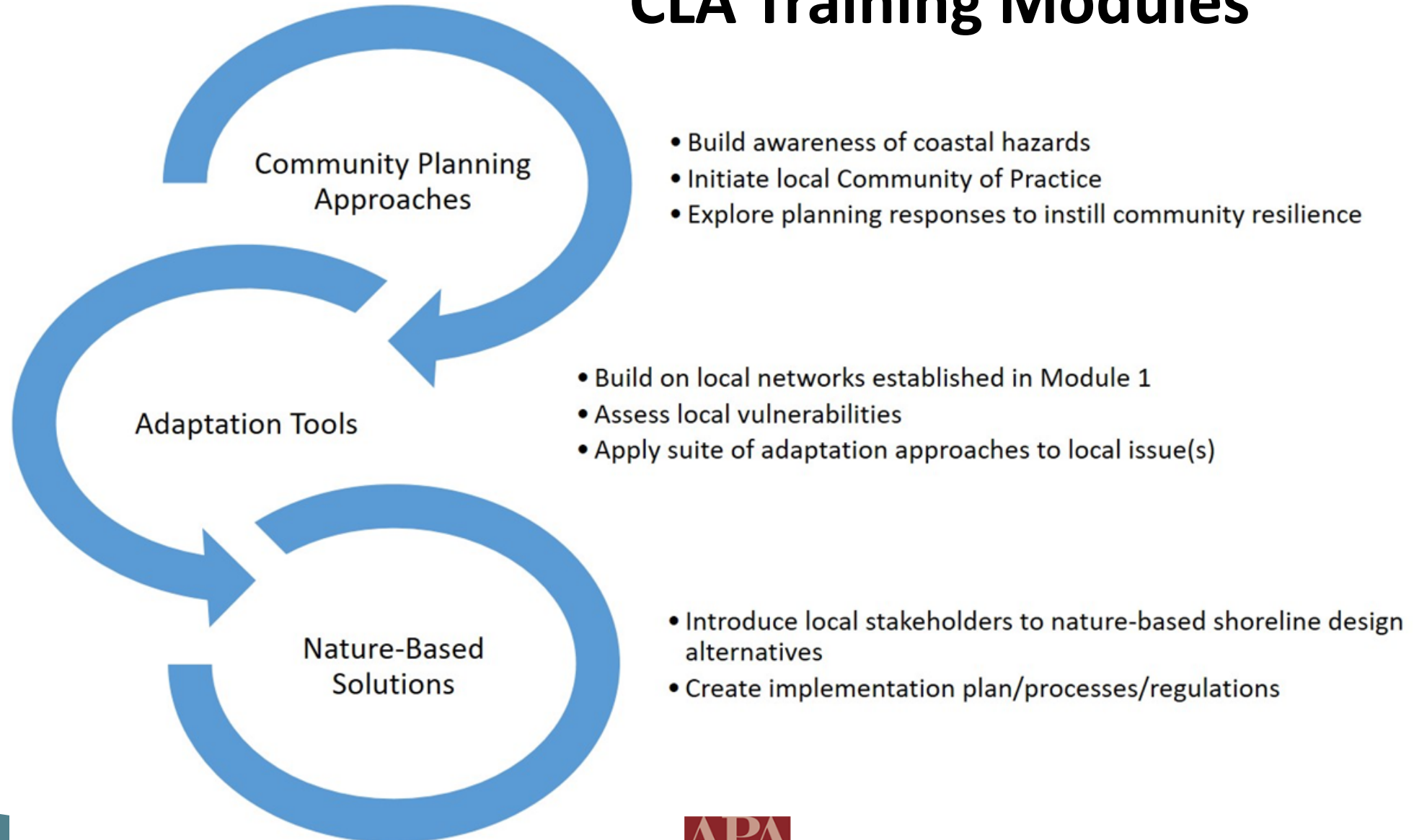
What can I do to get started?
To become a participant of the Coastal Leadership Academy or request to host a Coastal Leadership Academy for your community, contact Ronda Wuycheck at WuycheckR@Michigan.gov.

To learn more, visit Michigan.gov/ResilientCoast.

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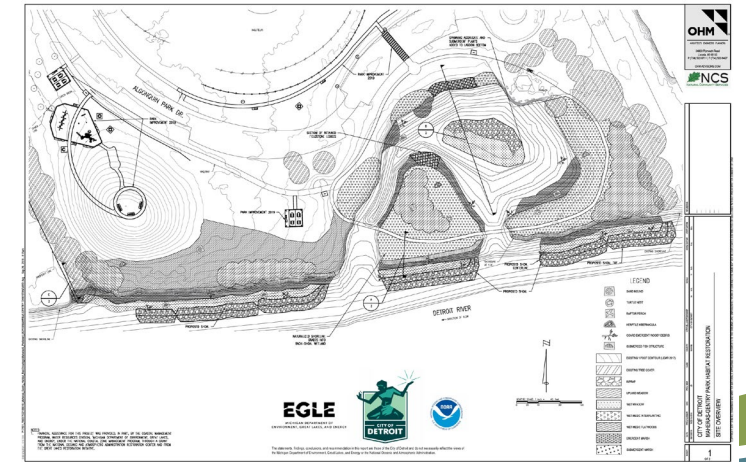
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CLA Training Modules



Healthy Habitats and Resilient Communities Initiative

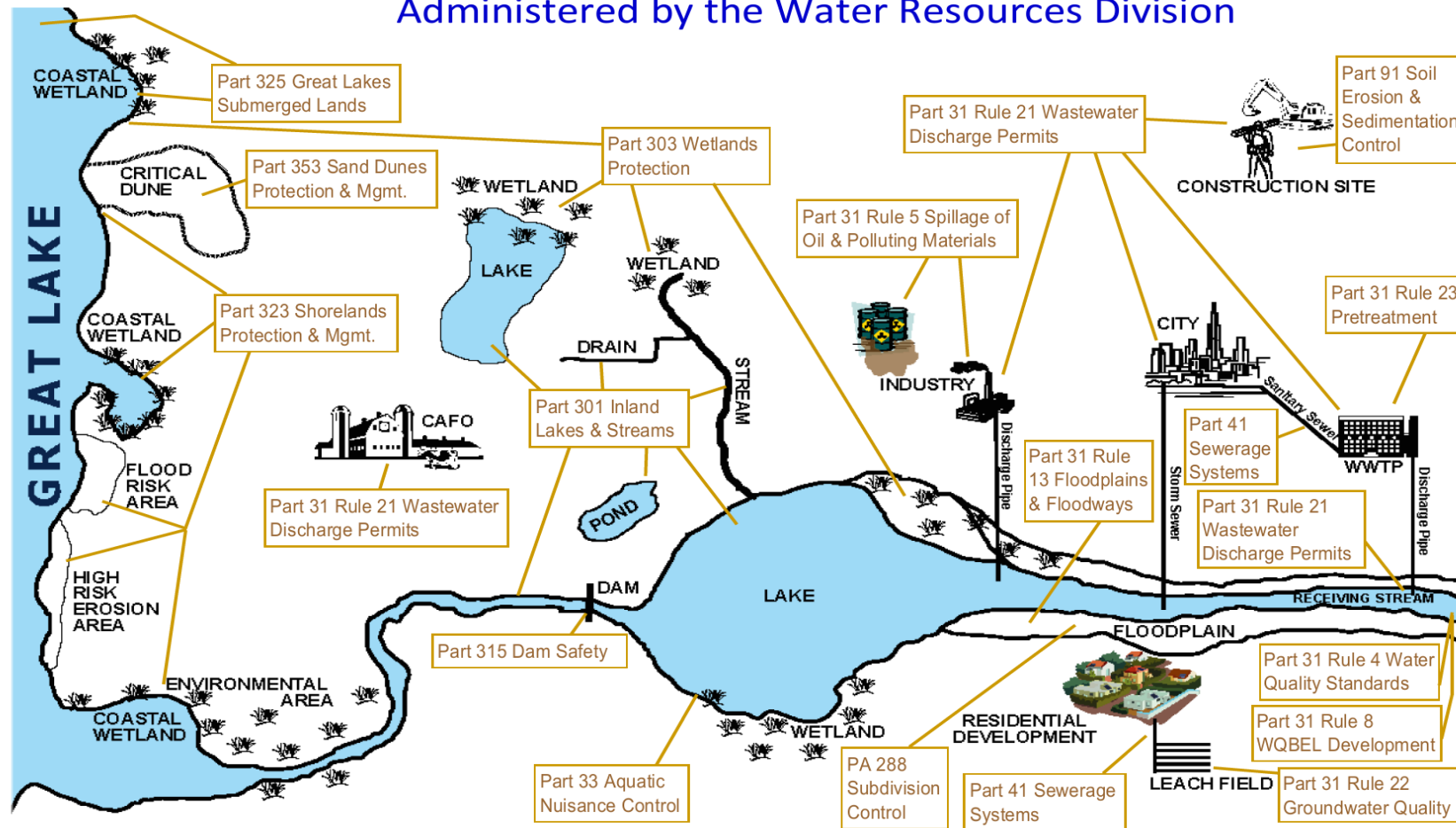
- ❖ Nature-based solutions for habitat preservation and restoration.
 - Natural Infrastructure
 - Green Infrastructure
- ❖ Work with communities to develop conceptual plans.



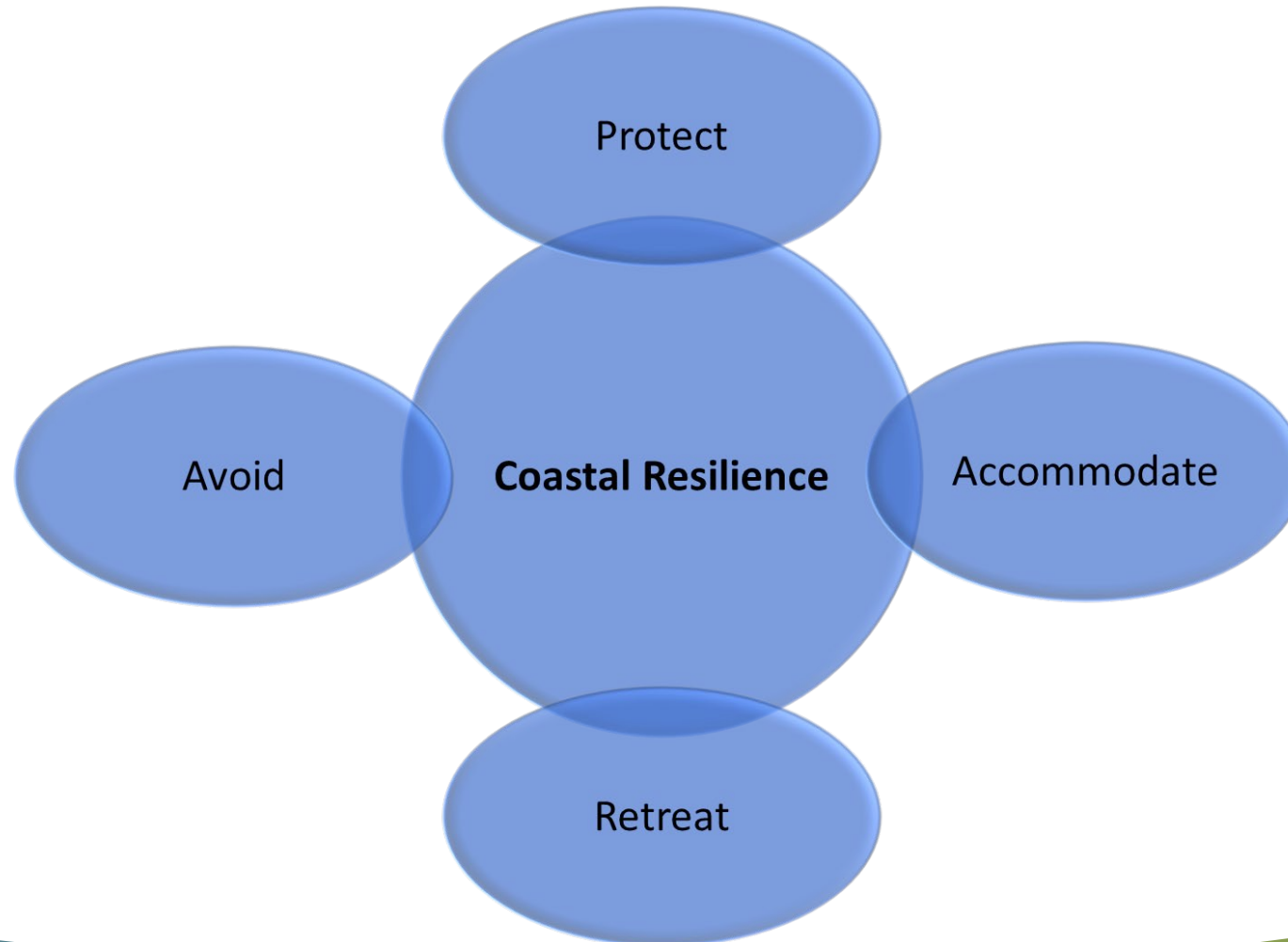
Water Resources Permit and Compliance Programs



Michigan Statutes and Rules of the Natural Resources and Environmental Protection Act, 1994 PA 451, as Amended
Administered by the Water Resources Division



Coastal Communities Adaptation Strategies Toolkit



ADAPTATION STRATEGIES FACT SHEET

STRATEGY

Beach Nourishment

ADAPTATION CATEGORY

SCALE

Site Neighborhood Community Regional

COST: Medium

MAINTENANCE: Low-Medium

LIFESPAN: Short-Medium



Example of a beach nourishment project

ADDRESSES THE FOLLOWING CLIMATE CHANGE HAZARDS



ECOSYSTEM SERVICES

Strategy effects are expected to improve, degrade, or not change the following values

Habitat	Water Quality	Carbon Storage	Aesthetics	Flood Mgmt.	Recreation /Tourism
↑	—	—	↑	↑	↑
—	—	—	—	—	—

DESCRIPTION: The process of adding sediment (sand) to an eroding beach to widen or elevate the beach to maintain or advance the shoreline seaward. Sediment can be sourced from inland mining, dredging from navigation channels, and/or offshore mining.

ADVANTAGES:

- » Helps to maintain sediment supply and coastal landforms
- » Little post-construction disruption to the surrounding natural environment
- » Protects structures behind the beach
- » Expands usable beach area
- » Lower environmental impact than structural measures

DISADVANTAGES:

- » Requires continual sand resources for re-nourishment
- » Does not provide high water protection
- » Beach nourishment sand usually erodes faster (2-3x) than the natural beach sand because it is not compacted
- » Expensive (several million dollars depending on the size of the beach)
- » Can have limited negative impacts on marine life, beach life, and endangered species (piping plover) during construction depending on timing and due to higher erosion rates (changing habitat)

ADAPTATION STRATEGIES FACT SHEET

STRATEGY

Dune Restoration/Creation

ADAPTATION CATEGORY

SCALE

Site Neighborhood Community Regional

COST: Medium

MAINTENANCE: Low-Medium

LIFESPAN: Short-Medium



Example of a dune creation project

ADDRESSES THE FOLLOWING CLIMATE CHANGE HAZARDS



ECOSYSTEM SERVICES

Strategy effects are expected to improve, degrade, or not change the following values

Habitat	Water Quality	Carbon Storage	Aesthetics	Flood Mgmt.	Recreation /Tourism
↑	—	—	↑	↑	—
—	—	—	—	—	—

DESCRIPTION: Restoring existing dunes or creating new dunes to protect the shoreline against erosion and flooding.

ADVANTAGES:

- » Preserving existing dunes will provide defense against wave action protecting inland habitats and infrastructure. If a suitable and sustainable source of sand is available for sand nourishment, this could provide significant protection against storm surges, flooding and erosion.
- » Restoration of existing dune systems including creation of additional row(s) of dunes in front of or behind existing dunes will make them less susceptible to erosion from storm surges increasing their longevity
- » Adds critical habitat for many coastal species (birds, marine mammals, other wildlife)
- » Can be connected with other natural areas to provide opportunity for birding and other recreational activities that don't require direct access to the dunes

DISADVANTAGES:

- » Upland habitat loss in exchange for potential benefits of constructed or restored dune system

ADAPTATION STRATEGIES FACT SHEET

STRATEGY

Conservation Easements/Restrictions

ADAPTATION CATEGORY

SCALE

Site Neighborhood Community Regional

COST: High

MAINTENANCE: Low

LIFESPAN: Permanent



View from public conservation land

ADDRESSES THE FOLLOWING CLIMATE CHANGE HAZARDS



ECOSYSTEM SERVICES

Strategy effects are expected to improve, degrade, or not change the following values

Habitat	Water Quality	Carbon Storage	Aesthetics	Flood Mgmt.	Recreation /Tourism
↑	↑	↑	↑	↑	↑
—	—	—	—	—	—

DESCRIPTION: The conservation of public or private property through a legally-binding agreement to preserve undeveloped land. Property owners sell, or otherwise transfer, the right to develop their land to a conservation entity in exchange for a reduced property tax assessment.

ADVANTAGES:

- » Allows for the conservation of land that can serve as habitat or flood buffers
- » Can be used to prevent development in areas that are vulnerable to flooding and erosion
- » The land owner will receive a lower property tax resulting from the loss of development potential
- » Most conservation easements are permanent (and apply to future landowners), so the land is permanently conserved
- » Can be used to prohibit shoreline armoring on private property

DISADVANTAGES:

- » The property will lose value as the "highest and best use" of the property (developed) is lost
- » Loss of property tax revenue for town/state
- » Perpetual conservation of the land may cause issues regarding development scenarios in the distant future
- » Requires legal assistance to prepare the easement and requires approval by the conservation commission, selectmen, state office of energy and environmental affairs, and state legislature via a public process

Protect

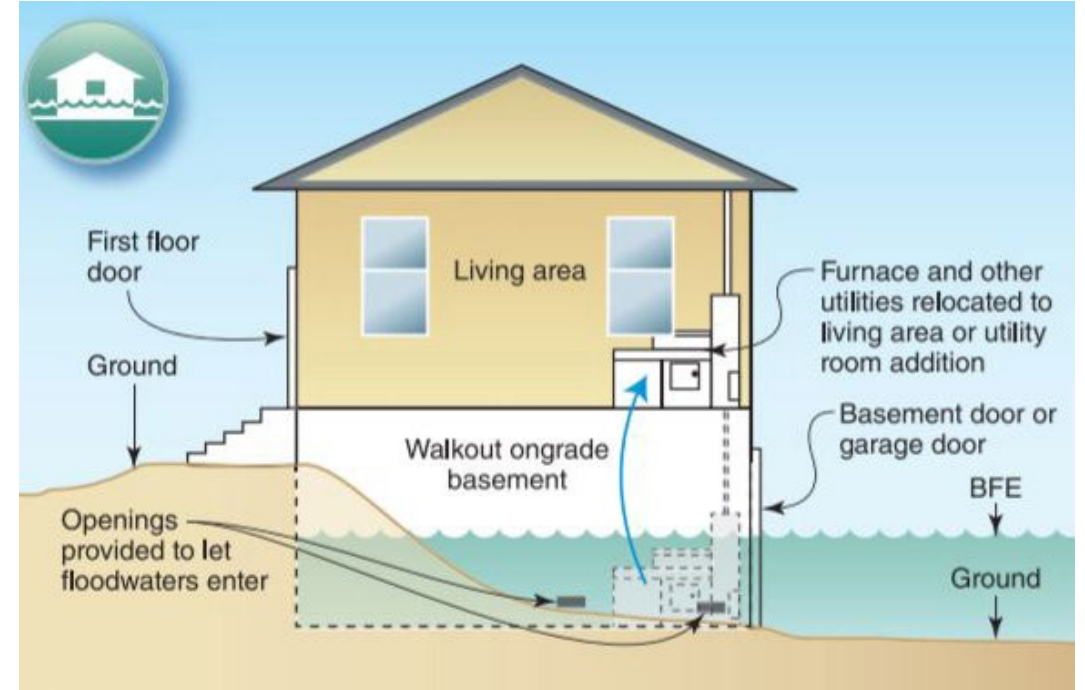
Refer to FEMA [Technical Bulletin 9](#)



Design and Construction Guidance for Breakaway Walls

Below Elevated Buildings Located in Coastal High Hazard Areas in accordance with the National Flood Insurance Program

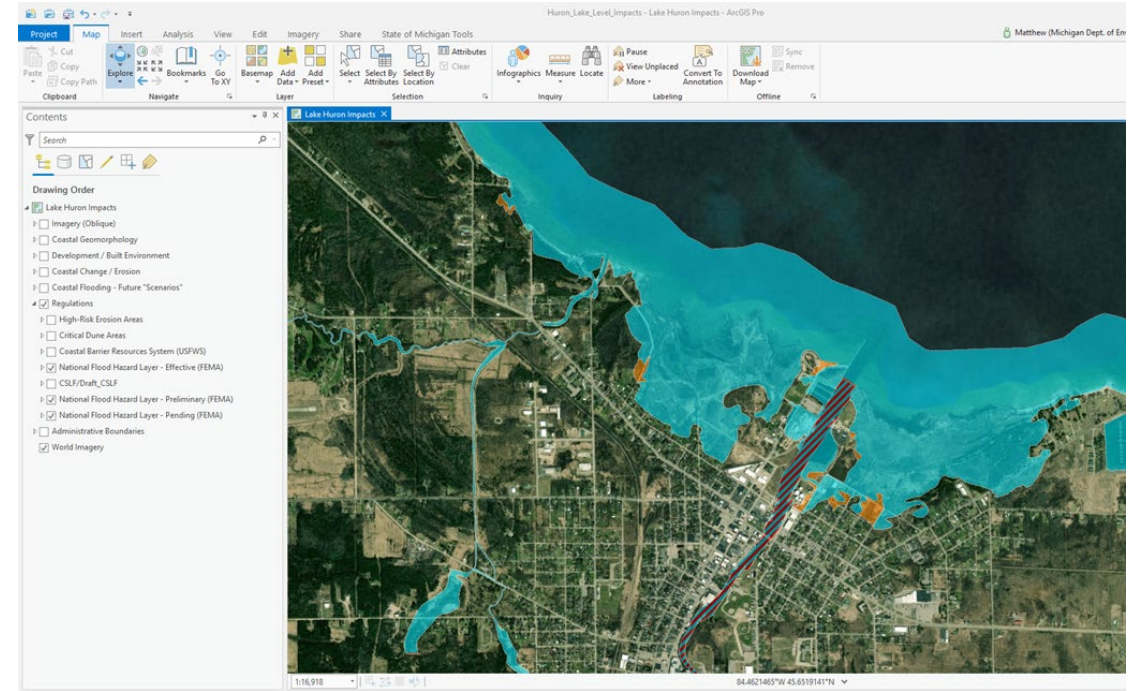
Technical Bulletin 9 / August 2008



Accommodate



Managed Retreat



Avoid

MCMP provides a Pathway to Resilience

**Technical Assistance and Training => Planning =>
Conceptual Plans => Shovel ready projects**

- Participating in a Coastal Leadership Academy training.
- Conduct a vulnerability assessment to identify gaps and recommendations.
- Create a Resilient Plan/Chapter that is formally adopted via Michigan Law.
- Adopt resilient policies/ordinance such as setback and no build zones.
- Implement adaptation Strategies.
 - Conduct feasibility of prudent and feasible alternatives that respect riparian rights and protects public trust.
 - Develop concept and engineering plans that can be permittable.
 - Install/implement nature-based solutions.
 - Habitat restoration such as dune and wetland mitigation.
 - Green infrastructure to slow the flow of stormwater.
 - Creative adaptation accommodation and protection practices.



MCMP Grant Assistance

- Who is Eligible: Eligible applicants include coastal communities (e.g., local units of government, cities, counties, villages, and townships), regional planning agencies, educational institutions, Tribal governments, and not-for-profits 501(c) organizations located within the approved [programmatic boundary](#).
- Grant Amount: Planning projects can be no less than \$10,000 and no greater than \$100,000. Site-specific low-cost construction projects can be no less than \$10,000 and no greater than \$200,000.
- How to Apply: Grant Funding Opportunities are released annually in September with a December application due date.
- Who do I contact for questions: For general or technical questions, the Focus Area Coordinators listed on the MCMP webpage.
- For more information, visit the Coastal Management Program webpage: www.michigan.gov/coastalmanagement.

MCMP Team



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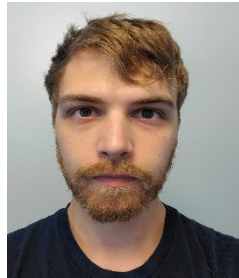
Coming Soon!
Coastal Hazards
Coordinator



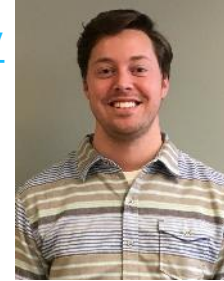
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